Chapter 5 - Identifying Key Best Management Practices, Initiatives, or Strategies for Implementation

To meet the watershed goals and objectives outlined in Chapter 4, a series of tasks, strategies or initiatives known as Best Management Practices (BMPs) are to be selected to address pollutants, impairments or concerns. A variety of management approaches are available to address water quality problems and more are being researched every year for implementation. These practices include regulatory and non regulatory approaches to address point sources of pollutants and non point sources of pollutants. In general management strategies or practices are groups or categories of cost effective management practices to be implemented to achieve comprehensive goals, such as reducing sediment loads from upland areas to surface waters. Individual management practices are site specific and often based on existing conditions, actions or structures for controlling pollutant sources.

These management practices can be implemented for various purposes such as:

- Protecting water resources and downstream areas from increased pollutant loads and flood risks.
- Conserving, protecting, and restoring priority habitats
- Setting aside permanent terrestrial and aquatic buffer areas
- Establishment of hydrologic infiltration or reserve zones.
- Acquiring conservation easements or property rights to protect natural features.

Management measures can also help control the pollutant loads to receiving surface waters by:

- Reducing the availability of pollutants.
- Reducing the pollutants generated (erosion control)
- Slowing the transport or delivery of pollutants by reducing the amount of water transported or by causing the pollutant to be deposited near the point of origin (e.g. detention basins for impervious areas, vegetated buffers to filter sheet flow, etc.)
- Causing the deposition of pollutants off-site before it reaches surface water.
- Treating the pollutant before or after it reaches the surface water by mechanical, chemical or biological intervention or transformation.

Structural, managerial and vegetative BMPs were selected from the DNRE, MDOT, OMB, MACDC, Michigan LID Manual, NRCS, and MDA manuals or, from specific BMPs developed by subcommittees for the watershed in cooperation with the Bay County Farm Bureau representatives. The BMPs are grouped into categories as they relate to practices for municipal zoning, landuse, and planning policies, municipal operations related to vegetative management practices, maintenance and operations procedures and recycling and composting on a county wide scale and finally agriculture

practices as related to managerial practices. The structural and vegetative management practices were grouped by LID (vegetated, infiltration, filtration), agricultural, detention & retention and pretreatment. The tables are available in Appendix XX.

BMPs to Achieve Goals and Objectives of the Watershed

BMPs for Warmwater Fisheries

The typical BMPs that will improve fisheries deal with water quality issues and improvement in aquatic habitat. The warmwater species of concern are walleye, northern pike, sunfish, rock bass, suckers, catfish, bullhead, and others found commonly in the watershed. By reducing the amount of sediment entering the surface waters and protection of the river corridors with vegetative buffers and other buffer zones will assist in meeting goals of restoration. Managing the overstory will help with temperature issues and provide assistance with DO issues during summer months.

BMPs for Wetland Restoration & Preservation

Wetland function restoration is a goal for this watershed, by function what is desirable is floodplain protection. Development of high quality wetlands that can serve as nutrient sinks for phosphorus, nitrogen, pathogens and filter out suspended solids. The DNRE's Wetland staff, Rob Zbiciak and other have put together a Landscape Level Wetland Assessment of the Kawkawlin River Watershed. This compilation of data is available on CD for use by municipal and township planners to assess areas for restoration and to help make decisions in land use planning for the future. The following managerial BMPs for corridor protection should be used to obtain or direct people for land donations, conservation easements or other land acquirement options.

Providing education on wetlands to raise awareness regarding the loss and historical functions of the wetlands and why the existing wetlands are important in this ecosystem.

Managerial BMPs for Corridor Protection

Managerial BMPs and acquisition of lands for conservation easements will be the focus point for these strategies. The Saginaw Bay Land Conservancy has been instrumental in the Corridor Assessment Committee and provided information on protecting private land for conservation through:

- Conservation Easements
- Donation
- Willed Donations
- Tax Advantages

A private landowner can donate lands either in the future or present, either format can be accommodated. If the landowner wishes to retain usage of the land and forgo developmental rights the tool of a conservation easement is an option. The main gist is that the property owner wishes to remain in possession of the right to use the land and enjoy it in its natural state. This type of agreement can be obtained. There are also

significant benefits relative to property taxes that can be obtained for the owner as well as income and estate tax benefits.

The best types of properties for this type of application are open spaces, ag lands that were former wetlands, flood plains, natural habitat, historical lands or general lands position in the landscape for outdoor recreation/education (riparian property for boat launches or interpretive wetlands).

Conservation easements and other land donation mechanisms are available for landowners such as donation through a will or a donation structured to provide income to the property owner via a annuity payment or charitable remainder trust structure. The land in this instance would not belong to the donor but they would have some negotiated benefits from it during their remaining lifetime. Numerous aspects of these donations are variable and need to be researched and talked over with family and advisors to the families. If the route decided upon is a land donation then the receiving land trust will need to be consulted before making any stipulations. The owners need to have all facts about the donation options communicated effectively to them. Ultimately, the landowner will want to make sure the land trust agrees to the care of the land and the have the ability to complete the care agreed upon in perpetuity.

There are three options for land preservation:

- Conservation easements
- Land donations, or
- Bargain sales of land

Each of these options can be customized to the property owners concept of what to do with the land, but each option has a different way of achieving the intent. These options can vary in significant ways which must be carefully considered by the donor when making decisions about land preservation.

Conservation Easements

Conservation easements can assist people who want to maintain ownership and use of the land or even sell it, but they ultimately wish to preserve the land in either its present condition or have it revert back to its previous landuse (e.g farmland to wetlands). With a conservation easement development rights are donated to preserve the other rights or values inherent in the land. By donation of these rights it can prevent future owners from using the land in a manner not specified in the agreement. For example a farmland cannot become a high density residential area or commercial development. The main benefit of a conservation easement is that ownership is maintained and they can do whatever else they want with the property as long at the legally established agreement is upheld. So farms can continue land use practices, the buildings for a farm are allowed to remain a preserved forest will remain as it is if that is what the landowner has agreed to in establishing the agreement.

There are many financial incentives associated with conservation easements such as lower property taxes for those who have waived development rights. Estate taxes for the heirs of property can be greatly reduced; they can be reduced from the high of 55% to a

much lower percentage when development rights are forfeited. An income tax deduction can be obtained for one time by having made sure the criteria is met of meeting federal tax requirements ensuring public benefit through preservation of land. The donation amount will equal the difference between the values of the land with the easement versus value without the easement.

Land Donations

The donation of land by a landowner can have many benefits. If the land is set aside in a manner where it is maintained as a preserve it will be, in perpetuity, available for the public's benefit. Certain landowners like this type of arrangement as some people like to know they have given something back to their community or region and will be remembered by the action. Of course, this can also be done anonymously by the landowner if so desired. This option can be used when land is no longer useable or has property taxes that have increased significantly for the landowner.

If a property owner wishes to donate, they must pick an organization that can be responsible for the land and ensure its protection. There are regional land conservancies in the Saginaw Bay Region that can accept such land or assist or educate the owner before such a donation takes place. During the process of donation, negotiations can be completed that will give the owner the right to live on the land until the end of their life or other agreed upon arrangement. For example, the owner may designate a spouse or other heir to live on the property during their lifetime. The land trust only receives control of the land when the heirs pass away. At the time of donation the landowner may receive some income tax benefits, these should be discussed with an accountant before hand to assure understanding of the tax benefits, this donation may also reduce estate taxes.

This type of donation can also be done by a will. This allows the owner to have complete control over the land while they are alive, and the will specifies the release of control to the designated land trust agency.

There is also an opportunity available to donate land to a trust where the owner can receive an income from the land; they can use a land donation that establishes a life income. This type of donation mechanism involves a charitable gift annuity where the property owner moves the land into a land trust's care and has the land trust make annuity payments to the designated beneficiaries for life or other specified time period. This type of arrangement can have tax benefits associated with the donation based on the value of the land versus the anticipated annuity payments.

A final donation mechanism is a charitable remainder unitrust. The land has a conservation easement placed on it, which is then given to a land trust. A trustee then sells the land and invests the profits from the sale. These funds are then partially paid to designated beneficiaries for a negotiated time frame. Any profits remaining from the sale go to the land trust to protect more land. Again, there are tax benefits for this type of donation depending on property values and payments to the beneficiaries. It is important

to get good advice when doing these types of donations and work with local or regional staff in the Saginaw Bay Region.

Bargain Sale of Lands

This type of land preservation is designed for landowners who would like to realize an immediate financial gain on their land and also at the same time, preserve it. A land trust will buy the land for less than fair market value. This will provide the landowner with some funds as well as some income tax reduction and also allow the land trust agency to preserve the land, which is the goal. The land trust must have the funds available for such a plan in order to make payments to the annuity.

Table 5.1 - Implementation Plan

Sources, Pollutants and Impairments to Designated Uses	Causes	Objectives	BMPs	Technical Assistance	Financial Assistance	Estimated Costs for Installation	Critical Areas (Priority Sub-watersheds)
Livestock (K) - Pathogens, Sediment	Unlimited livestock access	Exclude livestock from stream access	Livestock exclusion, water course crossing	NRCS, CD	Farm Bill Programs, 319, CMI, Landowner	$2.50/ft of fence	1, 2, 4, 5, 6, 7
			Alternative water source	NRCS, CD	Farm Bill Programs, 319, CMI, Landowner	$2,500	
	Lack of manure storage	Construct waste storage systems or other BMPs to prevent pathogens from accessing surface water	Agricultural waste storage facility	NRCS, CD	Farm Bill Programs, 319, CMI, Landowner	$10,000-$250,000	1, 2, 4, 5, 6, 7
			Nutrient management, CNMP	TSP, NRCS, Ag Consultant	Landowner, CMI, Farm Bill Programs	$5/acre	
	Lack of Education	Provide Domestic animal education for riparian dwellers or those along drains	Education Brochures	NRCS, Drain Comm., Ag Consultant	Landowner, CMI, Watershed Education Grants from GLRI	$2,500	1, 2, 4, 5, 6, 7
Faulty on site treatment systems (K) - Pathogens	Leaking, poorly maintained and over capacity on-site treatment systems	Encourage proper installation and maintenance of on-site treatment systems	On-site treatment system education	B.C.H.D.	Great Lakes Restoration Initiative (GLRI); landowner; CMI	$6,000 - $8,000	8, 3, 7
		Conduct public information sessions concerning on-site treatment system maintenance and mailing of surveys to specific sites.	Septic system education	B.C.H.D., DNRE, MSUE	319, GLRI	See I&E Costs	
Municipal wastewater - Pathogens	Poorly maintained, old sanitary sewer systems	Repair/replace municipal wastewater system based on a Risk Assessment	Improve system	DNRE	Bonds, loans, grants	$2,000,000+	8, 7
		Minimize discharges and sanitary sewer overflows	O&M	DNRE, Waste Water Treatment Plants (WWTP)	Utility Fees	Fee Based	
	Lack of access to sanitary main line	Provide access to districts or clusters of houses without access to a sanitary main	Extend existing system	WWTP	Utility Fees	Fee Based	
Inadequate sewer treatment - Pathogens	Lack of regulation oversight; equipment or human error	Encourage proper oversight for water quality	O&M	DNRE, WWTP	Utility Fees	Fee Based	
	Municipal overflows; timing of discharges	Regulate timing of discharges	O&M	DNRE, WWTP	Utility Fees	Fee Based	
Wildlife & Waterfowl - Pathogens	Overpopulation in open water areas	Control waterfowl and other wildlife populations	waterfowl and wildlife management	DNRE	Ducks Unlimited??	Varies	8, Main Branch of Kawkawlin
Road kill - Pathogens	Overpopulations and excessive amounts of road kill in ditches and drains	Manage deer populations	Deer management	DNRE, Whitetails Unlimited	DNRE	Varies	7, 6, 3, 5, 2
		Improve county pick-up program, education of county staff	Improve county program; I&E - Hazards of road kill	Bay County Road Commission, Board of Commissioners, DNRE	Road Commissions	$6,000/year / county	
	Fragmentation of habitat	Preserve habitats	Conservation Easements, Green space protection ordinance	Saginaw Basin Land Conservancy	CMI, GLRI	$3/sq.ft. land acquisition; $8,000 for adoption of ordinance	
Agricultural sheet, gully and rill erosion; sediment loading - sediment, removal/lack of food sources	Conventional tillage, plowing up to edge of stream (s), erosion, improper or failing tile outlets	Encourage cover crops and reduced tillage, grassed waterways and windbreaks, stabilize stream banks and tile outlets	Cover crops, crop residue management, conservation tillage, stream bank stabilization, vegetated buffer or filter strip, stabilized outlets, grassed waterways, windbreaks	NRCS, CD, MDA, Bay County Farm Bureau	Farm Bill Programs, 319, CMI, GLRI Landowner	Varies	7, 6, 5, 3, 2

Sources, Pollutants and Impairments to Designated Uses	Causes	Objectives	BMPs	Technical Assistance	Financial Assistance	Estimated Costs for Installation	
Stream bank erosion - Sediment	Altered hydrology (k)	Stabilize stream flows to moderate hydrology, reduce suspended solids and maintain the floodplain	Restore wetlands, floodplain management, storm water ordinance, conservation easement	NRCS, CD, Bay County Farm Bureau, MDA	Farm Bill Programs, 319, CMI, GLRI Landowner	$8,000 for adoption of ordinance	7, 6, 5, 4, 3, 2
Channelization, creation of drains/drain maintenance, modified hydrology/drain modifications/naturally occurring - sediment, water depth, loss of habitat	Straightening of waterways; channel improvements	Reduce suspended solids	SESC plans, Two stage channel design, critical area treatment, stream bank stabilization	BCDC & MCDC	Fees	Bid Process, Fee based	2, 7, 6, 5
	Channelization drains wetlands	Net gain of wetland acres; belt width; buffers; preserve natural areas	Wetland restoration, vegetated buffer or filter strip, conservation easements	DNRE, DU, FWS, NRCS, CD, private engineering firm	Farm Bill Programs, SBLC, Landowner	$2,350/acre	
	Re-directed stream flow; irrigation; low precipitation or low lake levels (Sub watershed 1); lack of vegetative cover	Conduct hydrologic assessment prior to modifying drain hydrology or re-directing stream flow; increase tree canopy	Hydrologic study, vegetated buffer or filter strip, irrigation mgt.	BCDC, DNRE, NRCS, CD	319 grants	$60,000 study, $250-$350/acre filter strip	
	Scouring of the stream bottom for drain maintenance removes stable natural habitat	Conduct two-stage channel construction; establish buffer strips; build and restore in-stream habitat	Two stage channel design, vegetated buffer or filter strip, grade stabilization	BCDC, NRCS, MDNRE	Drain assessments	Varies	
Construction and development (K) - Sediment	Lack of SESC controls	Improve use of BMPs to reduce suspended solids, use of more controls	SESC plans and approval process, inspections	County Enforcement Agency (e.g, BCDC or MCDC)	Fees	Fee based	All sub watersheds
Urban sheet and rill erosion - Sediment	Loss of pervious surfaces	Maintain and encourage pervious surfaces in development and encourage infiltration. Encourage LID	LID practices	DNRE, NRCS, CD	Municipalities, 319/CMI grants	Varies	All sub watersheds
Agricultural practices - Nutrients, pesticides, loss of habitat, removal/lack of food sources	Over-fertilization of fields; lack of riparian buffer; livestock in streams	Identify livestock operations adjacent to rivers; establish buffer or filter strips or other riparian buffer; increase canopy cover or canopy maintenance; reduce tillage; increase crop residue, exclude livestock from stream	Vegetated buffer or filter strip, crop residue management, PSNT, nutrient mgmt., livestock exclusion	NRCS, CD	Farm Bill Programs, Landowner	Varies	7, 6, 3, 2, 5
	Improper pesticide application and calibration; leaching; runoff	Increase of farms using Integrated Pest Management; installing riparian buffers such as filter strips, grassed waterways, other vegetative practices, cover crops	Integrated Pest Management, vegetated buffers or filter strips, grassed waterways	NRCS, CD	Farm Bill Programs, Landowner	Varies	
	Wetlands drained for farming	Net gain of wetland acres; preserve natural areas	Wetland restoration and protection, conservation easements	DNRE, DU, FWS	Farm Bill Programs, Landowner	$2,500/acre	2, 5, 6
	Farming to the edge of the drains, streams or river; moving farming equipment across drains, streams	Keep farming equipment out of surface waters; stabilize drain banks to reduce sedimentation	Watercourse crossing, stream bank stabilization, vegetated buffer or filter strip	NRCS, CD	Farm Bill Programs, Landowner	Varies	

Sources, Pollutants and Impairments to Designated Uses	Causes	Objectives	BMPs	Technical Assistance	Financial Assistance	Estimated Costs for Installation	Critical Areas (Priority Subwatersheds)
Urban practices - nutrients, pesticides	Over-fertilization of lawns and golf courses; lack of riparian buffer, faulty septic systems	Establish filter strips or other riparian buffer; grassed waterways; educate the public on proper disposal of yard waste; encourage proper installation and maintenance of septic systems, initiate a phosphorus ban on commercial lawn fertilizers	Vegetated buffer or filter strip, grassed waterways, public education program, septic system ordinance, enforce or support phosphorus free fertilizer ordinance, (Bay and Saginaw County have them) Home*A*Syst	NRCS, CD, Bay Co. Board of Commissioners, Bay County Health Dept. (BCHD)	GLRI, Farm Bill Programs, Landowner	Varies	8
	Improper pesticide application and no calibration; runoff	Educate homeowners on proper application	Lawn pest mgt., Home*A*Syst	BCHD, BCD, MSUE	DNRE, County	Varies	8
Urban expansion - loss of habitat	Wetlands filled for development	Net gain of wetland acres; greenways width; buffers	Wetland restoration, wetland ordinance, match state statute, increase awareness	DNRE, DU, FWS	Farm Bill Programs, SBLC, Landowner	$2,350/acre	8
	Influx of people building next to the surface waters, and removing riparian canopy and undergrowth	Install filter strips; establish forest buffers to increase tree canopy	Stream buffer ordinance	NRCS, CD	Farm Bill Programs, 319, CMI, Landowner, Municipalities	$8,000 for adoption of ordinance	8,3,2
Improper disposal of materials - pharmaceuticals	Lack of education	Clean sweep collection for pharmaceuticals	Clean sweep program for pharmaceuticals	Bay County Health Dept.	EPA, GLRI	Unknown	All sub watersheds
Zebra Mussels – invasive species	Introduction from ship ballast waters on the Great Lakes and have moved up the Pinnebog from Lake Huron; boats carry mussels that have adhered to the boat and introduce them into new waterbodies	Support invasive species bills; encourage involvement; minimize the spread of Zebra Mussels by conducting boat checks before launching	Invasive species management, I&E	NRCS, DNRE	DNRE, EPA	Unknown	8
Gobies, Invasive carp, other invasive fish	Ballast waters of ocean going ships dumping into Great Lakes, Chicago Canal	Support invasive species bills; encourage involvement; minimize the spread of invasive fish species. Determine how to decrease population and improve establishment of native fish. Closure of Chicago canal	Invasive species management	DNRE	DNRE	Unknown	All sub watersheds
Invasive vegetation (phragmites, purple loosestrife)	Invasive and opportunistic plants	Develop eradication program. Education people on recognizing the plants Elimination of the plants whenever possible	Herbicides, and biological BMPs or mechanical removal	DNRE, BCDC	Landowner, GLRI, DNRE	Varies	All sub watersheds
Invasive aquatic vegetation	Invasive and opportunistic aquatic plants	Develop eradication program. Education people on recognizing the plants Elimination of the plants whenever possible	Herbicides, and biological BMPs or mechanical removal	DNRE, Consultants	Landowners, Assessment district by township	Bid out, check with KRWPOA	8, 3, 7
Log jams/snags (Woody Debris) - trash and debris	High flow events; stream bank erosion	Manage woody debris; stabilize stream banks	Woody debris management, stream bank stabilization	BCDC, BCD	BCDC assessments	$45/lin.ft	2, 6, 5, 7, 3, 1
Pipe crossings - trash and debris	Old petroleum pipe crossings over the river; depositional areas in the river	Remove Pipe crossings that block navigable waters	Obstruction removal	DNRE	DNRE	Varies	8, 3, 7
Lack of restoration - trash and debris	No designated entities responsible for removing obstructions and maintaining navigable waters	Manage woody debris; organize volunteer stream clean-up activities	Woody debris management, volunteer clean up-public education	BCDC, BCD, DNRE	BCDC Assessments, DNRE	$45/ lin.ft	2, 6, 5, 7, 3, 1, 7, 3, 8
Beaver dams - trash and debris	Naturally occurring	Manage woody debris; remove if necessary	Woody debris management, dam removal, wildlife mgt.	DNRE	DNRE	$45/lin.ft	1
Dumping - trash and debris, obstructions	General misunderstanding of how humans negatively impact the watershed by discarding trash; lack of signs or threat of enforcement	Hold Annual River or Drain Clean-Up Days to remove trash from the rivers/streams/drains; increase visibility of "No Dumping" signs	Volunteer clean up-public education, dumping ordinance	DNRE, BCD	DNRE, County	$6,000 for ordinance adoption; $2,000 for Clean up days	All sub watersheds

Sources, Pollutants and Impairments to Designated Uses	Causes	Objectives	BMPs	Technical Assistance	Financial Assistance	Estimated Costs for Installation	Critical Areas (Priority Subwatersheds)
Limited places to enter the river - access sites	Much of the area is private property; not many access sites to the Kawkawlin River	DNRE to develop access sites on conservation easements; connect a water trail to the area Trail systems	Public access ordinance, conservation easements	DNRE, Consultants	DNRE	$2,500/acre	2, 7, 6, 5

Agencies Involved in Implementation of BMPs

A Technical Committee for the Kawkawlin Watershed will be developed for implementation of the BMPs recommended in this chapter. Its membership will consist of members from the stakeholders committee consisting of the Bay County Drain Commissioner or designee, DNRE representatives (Surface Water and ESSD), Bay County Conservation District, Saginaw Bay RC&D, USDA-NRCS, USDS-FSA, Bay County Farm Bureau, local government officials, Kawkawlin River Watershed Property Owners Association representatives, Saginaw Bay Land Conservancy, Saginaw Bay WIN, Little Forks Conservancy, landowners in the watershed, and private consultants & qualified watershed engineers.

Technical and Financial Assistance

The technical and financial assistance needed for the implementation effort of this watershed management plan and its BMPs is listed in Table XX and in the Appendices XXX. The majority of the future funding will come from many different sources, Michigan's CMI, the Federal governments Great Lakes Restoration Initiative (GLRI funds), Federal Section 319 funds, NRCS programs such as EQIP and WHIP, local funding from community foundations, Saginaw Bay WIN, county departments, and various conservation organizations.

Estimated Pollution Reductions from Proposed Actions, Strategies and BMPs

If the assumption that the pollutant reductions from the implementation of BMPs on the identified NPS sites will be approximately 80 percent for the sediment and nutrients listed. The total pollutant reductions from those sites listed will be 424 tons of sediment, 465 pounds of phosphorus, and 932 pounds of nitrogen.

The goal is to reduce sediment and nutrients by 25 percent in over the first 3 years and 90 percent in 15 years from the identified sites.

For the **entire Kawkawlin River Watershed**, the goal is to reduce sediment and nutrients by 25 percent in 3 years and 85 percent in 15 years from the other areas identified in future investigations in the Watershed. Additionally, one major goal is to reduce the potential for an oil spill in the river and Saginaw Bay by removal of the abandoned petroleum pipelines within 3 years, by 2014.